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SHRINKAGE OF GREASE WOOL IN RELATION TO PRICES

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SHRINKAGE OF GREASE WOOL IN RELATION TO PRICES 1/

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INTRODUCTION

In response to prevalent demand this publication points out the variations that occur in shrinkages of greasy shorn domestic wools, outlines some of the principal causes for variations in shrinkage, shows how these shrinkage variations influence the prices paid for grease wools, and shows how to calculate greasy-wool values from scoured-basis prices on the Boston market.

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Importance of Shrinkage

When shorn from the sheep, wool carries varied quantities of natural wool grease, dried perspiration, dirt, sand, chaff, seeds, and burrs. In this condition it is called "greasy wool" or "grease wool." Before greasy wool is manufactured, the natural grease and foreign matter must be removed. This is usually accomplished by a cleansing process called "scouring," which causes a considerable loss from the weight of the original greasy wool. This loss in weight is known in the trade as "shrinkage" and is expressed as a percentage of the original weight of the greasy wool.

Thus a pound of greasy wool is not a pound of pure wool fiber. A pound of greasy wool that later shrinks 60 percent in scouring consists of four-tenths of a pound of pure wool fiber and six-tenths of a pound of grease, dirt, and other foreign matter.

1/ This pamphlet was first issued in 1938 when the work to which it pertains was a part of the Bureau of Agricultural Economics. In July 1939, when the Agricultural Marketing Service was created, the work became a part of this agency.

RELATION OF CLEAN WOOL TO TOTAL
GREASE WOOL IN ONE LOT

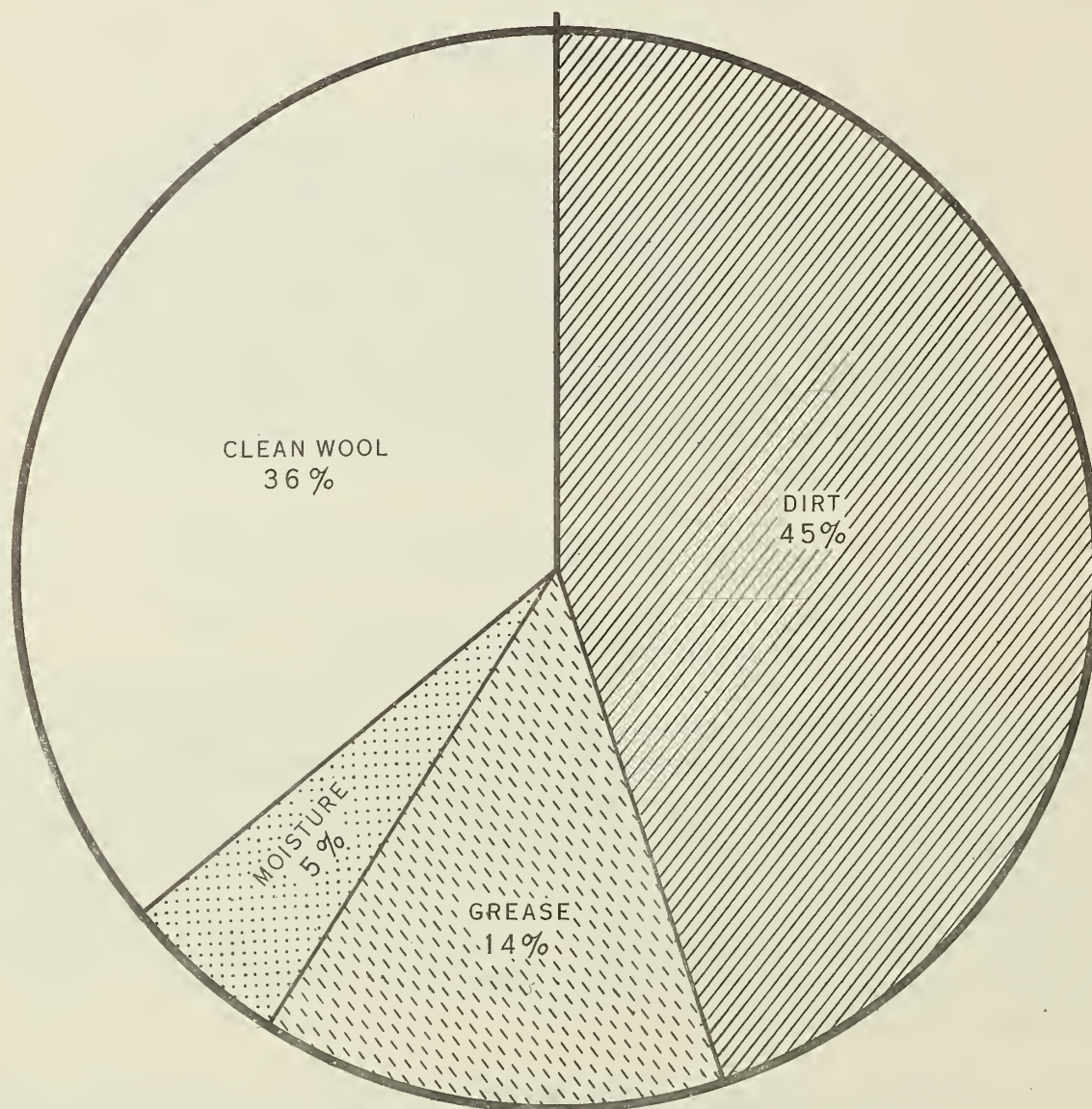


FIGURE 1. - This chart indicates the approximate quantities of clean wool, grease, dirt, and moisture contained in approximately fifteen hundred fine range-grown fleeces that were tested. (Data from U.S.D.A. Technical Bulletin No. 85, Table II.)

Variations in Shrinkage of Domestic Wools

Taking into consideration all wool-producing areas in the United States and all grades of wool, the shrinkages of greasy shorn domestic wools range mostly from a low of around 35 percent to a high 75 percent. The average shrinkage of the domestic clips of recent years has been estimated by members of the wool trade and manufacturers at around 60 percent. This means that, on the average, only about 40 pounds of scoured wool will be obtained from 100 pounds of greasy shorn wools. A few of the lightest-shrinking domestic wools may yield as much as 65 pounds of scoured wool, whereas many of the heaviest-shrinking domestic wools yield only 25 pounds of scoured wool per hundred pounds of greasy wool.

TABLE 1. - Approximate shrinkage ranges of domestic wools

Grade	Fleece wools		Territory wools
	Bright	Semi-Bright	
	Percent	Percent	Percent
Fine	57-63	63-70	64-75
1/2 Blood	52-58	57-64	58-67
3/8 Blood	44-50	52-58	53-62
1/4 Blood	41-46	47-55	48-57
Low 1/4 Blood	38-43	43-50	44-53
Common and Braid	38-43	43-50	44-53

Table 1 indicates roughly the ranges of shrinkage found in two well-known groups of domestic wools. These shrinkage percentages were compiled from estimates reported by dealers, mill buyers, and investigators, who are experienced in handling or studying domestic wools. Although these percentages do not cover the entire possible range of shrinkage, they are believed to provide a fair representation of the situation that exists with regard to shrinkage of Fleece and Territory wools over a period of years.

The two terms, Fleece and Territory, imply not only geographical differences in the localities where the wools are produced but also differences in the general characteristics of the wools. Important differences in the wool characteristics arise from differences in production practices, systems of flock management, and type of range or pasture on which the sheep are grown. These different characteristics have an effect on shrinkage.

Characteristic shrinkage variations naturally do not follow State lines, and this complicates the matter of estimating shrinkage based merely on the area in which the greasy wool under consideration was produced. In some States each of the three groups of domestic wools mentioned in table 1 is grown. Each of these States has certain areas in which shrinkages run fairly light while in other parts of the State the shrinkages may be rather heavy.

In general, Fleece wools are produced largely from small farm flocks in the Middle West and in the East. The broad group of domestic wools known as Fleece wools is further divided into two subgroups, Bright and Semi-Bright.

Bright Fleece wools are wools that are bright in color and of relatively light shrinkage. Nearly all the wools grown in the States east of the Mississippi River are of this type. Bright wools are also grown in parts of Minnesota, Iowa, and Missouri. Wools from Kentucky, Virginia, and Tennessee are notably light in shrinkage.

Semi-Bright Fleece wools are wools that are somewhat dark in color and of moderately heavy shrinkage. In this group are nearly all the wools grown in the farmland districts of the Dakotas, Nebraska, Kansas, and Oklahoma. Semi-Bright Fleece wools are also grown in parts of Minnesota, Wisconsin, Iowa, and Missouri. The Semi-Bright wools have heavier shrinkages than Bright wools. In fact, some of the heaviest of the Semi-Bright wools have shrinkages within about the same ranges as those of the Territory wools.

The group of States in which Fleece wools are produced, as a whole, also has rather a wide range of shrinkage variations. The Bright wools show ranges of shrinkage much narrower than the ranges of shrinkage of Territory wools (table 1). The Semi-Bright Fleece wool of the Dakotas, on the other hand, may lose nearly as much in scouring as the heaviest shrinking Territory wool. The Bright Fleece wool from around Springfield, Mo., and from the southeast part of that State, southern Indiana, and southern Illinois, may have shrinkages lighter than shrinkages of Ohio wool, while in other parts of these States wools may have a much heavier shrinkage. The three-eighths and quarter-blood wools of some sections of Michigan and New York often have as light shrinkage as Ohio Fleece wool. Fine Michigan Fleece wool, on the other hand, is inclined to have a consistently heavier shrinkage than the Fine Fleece wool of Ohio. Shrinkages of Fleece wool grown in Virginia, West Virginia, Kentucky and Tennessee are usually much lighter than shrinkages of Ohio Fleece wool of similar grade.

Territory wools, on the other hand, are wools grown under range conditions in the range areas of Washington, Oregon, the Inter-mountain States including Arizona and New Mexico, and in the range areas of the Dakotas, Nebraska, Kansas, and Oklahoma. Territory wools have a wide range in shrinkage and in color.

Other western wool-growing States produce wools that show wide ranges of shrinkage. Texas flocks under normal conditions produce some clips that shrink only 55 to 57 percent for good length 12-month wools. The average 12-month wools are usually estimated to shrink around 60 to 64 percent, but some shrink over 65 percent and, in the Panhandle, occasional clips with shrinkages running between 70 and 80 percent have been reported.

California produces wools that show a wide range of shrinkages. Fine clips from sheep of Merino and Rambouillet flocks of Humboldt and Mendocino Counties sometimes have shrinkages under 50 percent but the average for these counties is 52 to 61 percent. Southern California wools, on the other hand, sometimes have shrinkages as high as 70 percent or more.

Oregon wools likewise have varied shrinkages. The so-called "Valley wools" of Oregon - those produced from farm flocks in the Willamette Valley - sometimes have shrinkages lighter than the shrinkages of Ohio Fleece wools, while some of the range wools of Oregon may have shrinkages equal to the heaviest shrinking in Territory wools.

Factors Causing Variations in Shrinkage

Shrinkage variations are closely associated with fineness and length of wool staple as well as with the locality in which the wool is grown, production practices, and climatic conditions.

Shrinkage and Grade

Shrinkages of greasy wools vary directly with the degree of fineness of grade (table 1). Under ordinary conditions in a given locality, Fine wools shrink more than 1/2 Blood wools, and 1/2 Blood wools shrink more than 3/8 Blood. Hence, shrinkages of greasy wools tend to decline with each step of increase in the coarseness of the fiber. But conditions vary from one locality to another. As an illustration, the 3/8 and 1/4 Blood grades of wool of one locality may have heavier shrinkages than the 1/2 Blood grade of another locality, as can be readily noted by a study of the overlapping of the shrinkage ranges for Territory wools shown in table 1. This makes it necessary to study the grade of wool in connection with the local conditions that influence shrinkages. In such a study, the official standards of the U. S. Department of Agriculture (figure 2) are useful. Sets of practical forms of the standards have been prepared by the Agricultural Marketing Service for distribution.

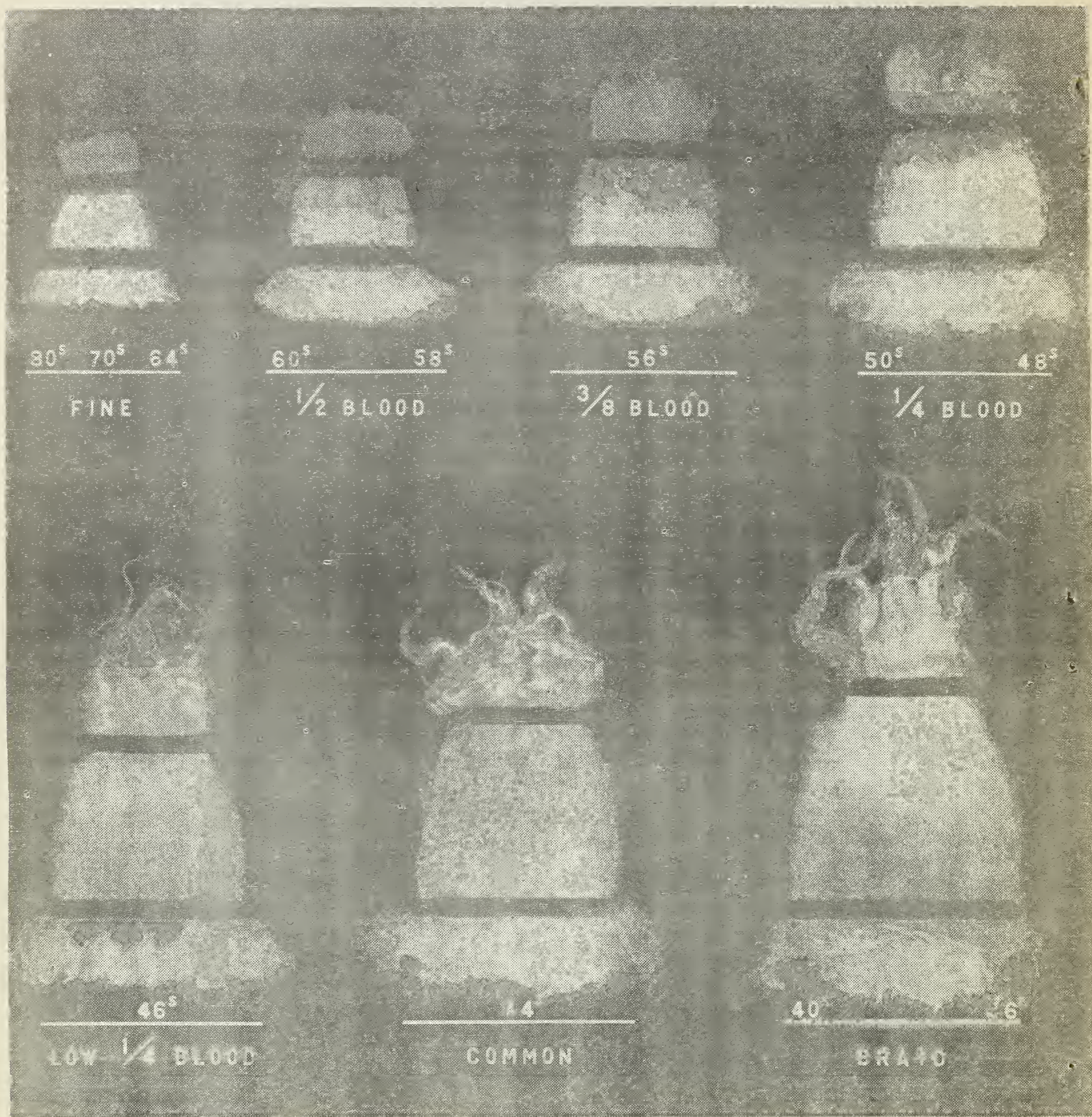


FIGURE 2. - Grades of wool as represented in the practical forms of the official standards for grades of wool.

Shrinkage and Length of Staple

Shrinkage variations are also related to some extent to length of staple. This is especially true of Fine and 1/2 Blood wools. In coarser wools, length is not so important a factor in shrinkage variations as it is in 1/2 Blood and Fine wools. The usual tendency in the Fine wools is for the long staple to show lighter shrinkages than the short-staple wools. Shrinkages of Staple Combing length Fine wools in individual lots may run 1 to 2 percent lighter than shrinkages of French Combing length, and 2 to 3 percent lighter than shrinkages of Clothing length wools. The same tendency is found in different lengths of 1/2 Blood wools, but the difference in shrinkage due to length is inclined to be smaller than in Fine wools.

Shrinkage and Locality

Variability of shrinkages in greasy wool is a characteristic by no means peculiar to the wools of this country. Wools from Australia and South America have variations in shrinkages that are associated with the country in which the wools are produced. Likewise, the wools of each country have shrinkage differences that are more or less characteristic of the different producing areas in the country. Recognition of the universal tendency of the shrinkages of wools to vary, led to the adoption by the Congress of the United States of a Tariff Law which, in regard to wool, provides that the duties be levied upon the clean content rather than upon the actual weight of wools imported.

That shrinkages vary as between particular localities is true because of natural conditions characteristic of the localities. The character of the soil over which sheep graze has a decided bearing upon the shrinkage of the wool. In pastures and ranges that have a loose sandy soil and a thin covering of vegetation, foreign material like sand is likely to get into the fleeces. Shrinkages are inclined to be heavy when sand comprises any considerable part of the foreign matter in fleeces, although appearance of fleeces may be misleading, for the wool may be light in color, suggesting lightness of shrinkage. On the other hand, fleeces may often be quite dark because of the presence of dark-colored soil of the grazing land or dust from corrals, but the shrinkage may not be very heavy because such dirt is comparatively light in weight.

Sheep that have been grazed on heavily grassed pastures produce fleeces with comparatively light shrinkages because the dense sod reduces the quantity of loose soil or sand that comes in contact with the wool. The bluegrass pastures of Kentucky have contributed to the reputation for light shrinkages of wools from that district. The sandy, sparsely vegetated acreages common to many of the western sheep-producing States are largely responsible for the heavy shrinkage of wools coming from that area.

Variations in natural conditions that influence shrinkage, like soils and vegetation, are such that sometimes within a distance of 50 miles, differences in shrinkage of 5 to 8 percent are found in wool clips of comparable grade and length, from sheep of similar breeds.

Shrinkage and Climatic Conditions

The climatic conditions that prevail in a given locality during a year are taken into consideration in estimating the probable shrinkage of wool produced in that locality. Droughts and their detrimental effect upon pastures and ranges may cause the growth of the wool to be less than normal, and short-staple wools tend to run heavier in shrinkages than do long-staple wools. Then droughts frequently are attended by dust and sand storms which may greatly increase the shrinkages of wools produced in drought areas or in the areas over which clouds of dust and sand are driven. Heavy rains that occur just before shearing may wash a considerable portion of the foreign matter out of the fleeces before they are shorn and cause wools to have unusually light shrinkages. A continuous blanket of snow on ranges during the winter helps to keep fleeces clean and free from foreign matter which means that the shrinkages will be light, while an open winter tends to increase shrinkages as the sheep constantly come into contact with dirt, sand, and other foreign materials that get into the fleeces.

How Variations in Shrinkage Influence Prices of Greasy Wools

The variations in shrinkages of greasy wools present a universal problem in all transactions in wool because it is the clean content that determines the value and no simple method has been developed whereby the clean content of a clip of wool may be ascertained quickly, accurately, and economically. The Agricultural Marketing Service, in cooperation with Agricultural Colleges in the principal wool-producing States, has under way a research program that aims to perfect a reliable method of ascertaining the shrinkage of a lot of greasy wool from a small sample that is representative of the entire lot.

Wools Marketed in Greasy Condition

Growers sell their wools in the greasy condition and the established practice of worsted manufacturers and topmakers is to buy wools in that condition. Buyers for worsted mills and topmakers prefer to make their original examination of a lot of wool - to ascertain the grade, length, strength, character, and uniformity - before the wool is scoured. They usually refuse to buy wools that have been scoured. This practice is generally followed the world over by the processors who use the worsted system of manufacture.

The wool is paid for at a certain price per pound of greasy wool, but before the bid is made the buyer estimates the approximate percentage of clean wool fiber that the greasy wool will yield, and bases his bid on that.

Greasy Wools Quoted on a Scoured Basis

Market prices of wool, with but few exceptions, are quoted on a scoured basis. Wools grown in the West, Southwest, and in several States of the Corn Belt have shrinkages of such wide variations that prices on a grease basis alone give little information as to market prices. The grease-basis price on an individual lot of greasy wool may represent the market price for that particular lot but may not be within 5 cents per pound of the market price of another lot of wool having a similar degree of fineness and length of staple, but having a different shrinkage (table 2).

Wools that are quoted on a scoured basis are actually wools that are still in the greasy condition - not yet scoured. This fact is often misunderstood. The scoured-basis price is for the clean wool fiber that will be gotten from the greasy wool. For example, the scoured-basis price, "Fine French Combing 85-87¢," means that fine wool of French Combing length, after being scoured, is worth 85 to 87 cents per pound, excluding the cost of scouring. In actual trading, the quantity of pure wool fiber in greasy wool is estimated. The cost of scouring is not included in the scoured-basis price.

TABLE 2. - Scoured-basis prices per pound, Boston, for Fine and 3/8 Blood Territory wools, and the grease-equivalent prices at various shrinkages

Grade and length	:	Market prices :	Grease-equivalent prices		
			light	medium	heavy
		scoured basis 1/	shrinkage	shrinkage	shrinkage
		Cents	Cents	Cents	Cents
Fine Combing (Staple)		88-90	33-34	30-31	28-27
Fine French Combing		85-87	32-33	29-30	25-26
Fine Clothing		81-83	31-32	27-28	24-25
3/8 Blood Combing		78-82	38-40	35-37	33-35
3/8 Blood Clothing		73-75	35-36	33-34	31-32

1/ Compiled from the Weekly Review of the Wool Market, mimeographed report released by the Department at Boston, Mass., for the week ending October 24, 1936.

Table 2 gives a partial list of the scoured-basis market prices at Boston for Territory wools when the market was active and frequent sales were being closed on most grades. The table also gives approximate grease-equivalent prices for these grades at various shrinkages.

The shrinkages upon which the grease equivalents in table 2 are computed are those frequently estimated for lots handled on the Boston market, but in selecting the percentages of shrinkage for this example, no attempt was made to cover the entire range of variations in shrinkage. The purpose is to show the influence of shrinkages upon the prices paid for greasy wools.

In accordance with shrinkage variations, prices paid for grease wool vary over a rather wide range. Usually, prices for grease wool show a range much wider than the range for scoured-basis prices for wools of similar fineness and length. For example, early in the clip season of 1937, Medium Dakota wools, in lots with Combing and Clothing lengths, of $3/8$ and $1/4$ Blood grades, packed together, were sold through Boston wool houses at around 34 to 35 cents in the grease, delivered to eastern buyers, whereas at the same time, Ohio and Michigan wools put up in the same way were bringing 39 to 40 cents. The scoured-basis prices on the Dakota wools and on the Ohio and Michigan wools, delivered to buyers, were in the range of 71 to 73 cents. The differences in "grease prices" were caused by the differences in shrinkages. The Dakota wools were being estimated to shrink 51 to 52 percent, while the Ohio and Michigan wools packed in the same way were being estimated to shrink 45 to 46 percent.

Grease-basis prices on original-bag lines of Fine Territory wools of comparable length have been observed to vary as much as 10 to 12 cents per pound during the same week in the Boston market, because of the wide variations in shrinkages of the greasy wools.

The principal reason for the differences in grease-basis prices for wools of the same grade is found in the differences in yield of scoured wool fiber. For example, wools shrinking 62 percent yield 38 pounds of scoured wool per hundred pounds of greasy wool, while wool shrinking 66 percent yield only 34 pounds of scoured wool per hundred pounds of greasy wool, and wools shrinking 70 percent yield only 30 pounds of scoured wool per hundred pounds of greasy wool. These are shrinkages found quite generally in Fine Territory, Texas, and West coast wools. Bright $1/4$ Blood Fleece wools often shrink only 42 percent, which means that they yield 58 pounds of scoured wool per hundred pounds of greasy wool. Semi-Bright $1/4$ Blood Fleeces, on the other hand, often shrink 50 to 55 percent, which means that they yield only 45 to 50 pounds of scoured wool per hundred pounds of greasy wool.

Bright Fleece wools from a number of the eastern farm States can be quoted satisfactorily on a greasy basis. Table 1 shows that the ranges of shrinkages for the various grades of Bright Fleece wools are narrower than for the corresponding grades of Territory wools and that the ranges of shrinkages for the various grades of Fleece do not show as much overlapping as occurs in the ranges of shrinkages for grades of Territory wools. Even in the case of the Bright Fleece wools, however, grease-basis prices are determined in the final analysis by the market prices being paid on a scoured basis for wools of similar fineness and length.

How To Calculate Grease-Basis Prices

Provided a grower has a good estimate of the shrinkage of his wool, knows the scoured-basis market price, and the costs of marketing, the approximate Boston grease-basis price and local grease-basis price can be calculated.

Estimating the Boston Grease Price

Assuming that the shrinkage of a clip of wool is 67 percent and the market price is 88 cents, scoured basis, in Boston, a grower can make calculations, using as the basis of the computation a unit of 100 pounds as follows:

Total quantity of grease wool	100 pounds
Estimated shrinkage 67 percent	
Loss in scouring - 67 percent of 100 pounds ..	<u>67</u> pounds
Estimated quantity of scoured wool	33 pounds
Market price, scoured basis	88 cents per pound
Value of scoured wool: $\$0.88 \times 33 =$	$\$29.04$
Now, there are 100 pounds of grease wool	
Therefore, the approximate grease-wool price	
is $\$29.04 \div 100 =$	$\$0.2904$ or 29 cents per pound

The price of 29 cents per pound represents the approximate price of the greasy wool in Boston.

An estimate of the Boston grease-basis price may be obtained from table 3, provided the shrinkage and the scoured-basis market price are known. If, for example, a scoured-basis market price of 75 cents is quoted for a wool that shrinks 50 percent, start at the 75-cent line in the column headed "Scoured-basis price" and follow to the right until the column headed by "50" is reached. At this point will be found $37\frac{1}{2}$ cents, which is the grease-basis price for a greasy wool shrinking 50 percent and worth 75 cents, scoured basis.

TABLE 3. - Grease-basis prices per pound at given shrinkages and scoured-basis prices

Scoured-basis :		Grease-basis prices								
basis :		Percent of shrinkage								
Prices :	35	40	45	50	55	60	65	70	75	80
Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
130	84 $\frac{1}{2}$	78	71 $\frac{1}{2}$	65	58 $\frac{1}{2}$	52	45 $\frac{1}{2}$	39	32 $\frac{1}{2}$	26
125	81 $\frac{1}{2}$	75	69	62 $\frac{1}{2}$	56 $\frac{1}{2}$	50	44	37 $\frac{1}{2}$	31 $\frac{1}{2}$	25
120	78	72	66	60	54	48	42	36	30	24
115	75	69	63 $\frac{1}{2}$	57 $\frac{1}{2}$	52	46	40 $\frac{1}{2}$	34 $\frac{1}{2}$	29	23
110	71 $\frac{1}{2}$	66	60 $\frac{1}{2}$	55	49 $\frac{1}{2}$	44	38 $\frac{1}{2}$	33	27 $\frac{1}{2}$	22
105	68 $\frac{1}{2}$	63	58	52 $\frac{1}{2}$	47 $\frac{1}{2}$	42	37	31 $\frac{1}{2}$	26 $\frac{1}{2}$	21
100	65	60	55	50	45	40	35	30	25	20
95	62	57	52 $\frac{1}{2}$	47 $\frac{1}{2}$	43	38	33 $\frac{1}{2}$	28 $\frac{1}{2}$	24	19
90	58 $\frac{1}{2}$	54	49 $\frac{1}{2}$	45	40 $\frac{1}{2}$	36	31 $\frac{1}{2}$	27	22 $\frac{1}{2}$	18
85	55 $\frac{1}{2}$	51	47	42 $\frac{1}{2}$	38 $\frac{1}{2}$	34	30	25 $\frac{1}{2}$	21 $\frac{1}{2}$	17
80	52	48	44	40	36	32	28	24	20	16
75	49	45	41 $\frac{1}{2}$	37 $\frac{1}{2}$	34	30	26 $\frac{1}{2}$	22 $\frac{1}{2}$	19	15
70	45 $\frac{1}{2}$	42	38 $\frac{1}{2}$	35	31 $\frac{1}{2}$	28	24 $\frac{1}{2}$	21	17 $\frac{1}{2}$	14
65	42 $\frac{1}{2}$	39	36	32 $\frac{1}{2}$	29 $\frac{1}{2}$	26	23	19 $\frac{1}{2}$	16 $\frac{1}{2}$	13
60	39	36	33	30	27	24	21	18	15	12
55	36	33	30 $\frac{1}{2}$	27 $\frac{1}{2}$	25	22	19 $\frac{1}{2}$	16 $\frac{1}{2}$	14	11
50	32 $\frac{1}{2}$	30	27 $\frac{1}{2}$	25	22 $\frac{1}{2}$	20	17 $\frac{1}{2}$	15 $\frac{1}{2}$	12 $\frac{1}{2}$	10
45	29 $\frac{1}{2}$	27	25	22 $\frac{1}{2}$	20 $\frac{1}{2}$	18	16	13 $\frac{1}{2}$	11 $\frac{1}{2}$	9

Estimating the Local Grease Price

The local grease price is estimated by deducting from the estimated Boston grease-basis price all the costs of marketing. These costs include cartage, freight, storage, insurance, selling commissions, and grading, if the wool cannot be sold to advantage in original bags. Freight rates can be obtained from local offices of transportation companies. Freight rates to Boston from the principal wool-producing areas of the United States range from around \$1 to about \$2.70 per hundred pounds. Selling commissions vary somewhat, but the usual rate for selling on commission in Boston is \$2 per hundred pounds, or 2 cents per pound for wools in original bags. This charge of \$2 per hundred pounds includes 4-months' storage. If wool is to be graded, there is an additional charge of about one-half cent per pound. All charges are added and the total is deducted from the Boston grease-basis price to arrive at the local grease-basis price.

In order that a grower may accurately compute the value of a clip of wool in the grease it is necessary that he know (1) the shrinkage of his wool (2) its market classification and grade, (3) the scoured-basis market price for wool of such a market classification and grade, and (4) the cost of marketing. Current quotations for the various market classes and grades of domestic wool sold on the Boston market are released weekly, on a scoured basis, in a mimeographed report issued by the Agricultural Marketing Service.